

## \* NOTICES \*

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## DETAILED DESCRIPTION

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[A detailed explanation of the device]

[0001]

[Industrial Application]

About an endoscope type ultrasonic probe, in more detail, this device makes it possible to make a trunk thin, and it is related with the endoscope type ultrasonic probe which improved flexibility.

[0002]

[Description of the Prior Art]

Drawing 4 is an internal structure figure of the tip end part of an example of the conventional endoscope type ultrasonic probe.

This endoscope type ultrasonic probe 51 equips the tip side of the turnable long and slender trunk 52 with the ultrasonic sensor 53.

It has the structure of telling the signal from the ultrasonic sensor 53 to the cable with which it was connected to the end side of the trunk 52 by FPC(Flexible Print Circuit) 54.

FPC54 is wound around spiral shape because flexibility is improved and the trunk 52 enables it to be crooked in every direction.

[0003]

Drawing 5 is a front view taking out and showing the ultrasonic sensor 53 and FPC54. 56 is a circuit pattern.

[0004]

[Problem(s) to be Solved by the Device]

In the above-mentioned conventional endoscope type ultrasonic probe 51, since FPC54 is wound around spiral shape, hollow sections are formed and there is a problem that the trunk 52 cannot be made not much thin. There is a problem that sufficient crookedness is not obtained.

FPC54 becomes long and there is a problem that a cross talk increases.

[0005]

Then, the purpose of this device is easy composition and there is in providing the endoscope type ultrasonic probe which a trunk can be made smoothly crooked about all the directions, can be made to make a trunk thin, and could be made to shorten FPC.

[0006]

[Means for Solving the Problem]

An endoscope type ultrasonic probe of this device equips the tip side of a turnable long and slender trunk with an ultrasonic sensor, and a signal from that ultrasonic sensor by FPC. In an endoscope type ultrasonic probe which tells a cable connected to the end side of said trunk, two or more slits are provided in accordance with the length direction of FPC, and it is characterized [ constitutional ] by rounding off FPC crosswise.

[0007]

[Function]

In the endoscope type ultrasonic probe of this device, two or more slits are provided in FPC in accordance with the length direction, and it is \*\*\*\*\*. The width of FPC is subdivided by these slits and it becomes cheap in slight roundness crosswise about FPC by them. Therefore, a trunk can be made thin. A trunk can be made smoothly crooked about all the directions also in the state where it rounded off.

FPC can be shortened and a cross talk can be reduced.

[0008]

[Example]

Hereafter, the example shown in a figure explains this device still in detail. Thereby, this device is not limited.

Drawing 1 is an internal structure figure of the tip end part of one example of the endoscope type ultrasonic probe of this device.

This endoscope type ultrasonic probe 1 equips the tip side of the turnable trunk 2 with the ultrasonic sensor 3.

It has the structure of telling the signal from the ultrasonic sensor 3 to the cable with which it was connected to the end side of the trunk 2 by FPC4.

FPC4 is rounded off crosswise and the circumference is surrounded by the coil spring 7.

The coil spring 7 is connected to GND of the ultrasonic sensor 3.

[0009]

Drawing 2 is a front view taking out and showing the ultrasonic sensor 3 and FPC4. However, FPC4 is in the state which is not rounded off.

5 is a slit.

It is provided by arrangement that it divides the circuit pattern 6 two [ at a time ].

The slit 5 is deeply cut using a dicing saw. Providing by laser beam machining etc. is also possible.

[0010]

In this endoscope type ultrasonic probe 1, as shown in drawing 3, the trunk 2 becomes thin and it can be smoothly crooked now in all the directions.

FPC4 can be shortened and a cross talk decreases.

[0011]

[Effect of the Device]

A trunk can be made thin and a trunk can be made smoothly crooked about all the directions with easy composition according to the endoscope type ultrasonic probe of this device.

For this reason, the operativity of insertion inside of the body improves.

Since there are few cross talks, image quality improves.

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TECHNICAL FIELD

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[Industrial Application]

About an endoscope type ultrasonic probe, in more detail, this device makes it possible to make a trunk thin, and it is related with the endoscope type ultrasonic probe which improved flexibility.

[0002]

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EFFECT OF THE INVENTION

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[Effect of the Device]

A trunk can be made thin and a trunk can be made smoothly crooked about all the directions with easy composition according to the endoscope type ultrasonic probe of this device.  
For this reason, the operativity of insertion inside of the body improves.  
Since there are few cross talks, image quality improves.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Device]

In the above-mentioned conventional endoscope type ultrasonic probe 51, since FPC54 is wound around spiral shape, hollow sections are formed and there is a problem that the trunk 52 cannot be made not much thin. There is a problem that sufficient crookedness is not obtained. FPC54 becomes long and there is a problem that a cross talk increases.

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Then, the purpose of this device is easy composition and there is in providing the endoscope type ultrasonic probe which a trunk can be made smoothly crooked about all the directions, can be made to make a trunk thin, and could be made to shorten FPC.

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**MEANS**

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**[Means for Solving the Problem]**

An endoscope type ultrasonic probe of this device equips the tip side of a turnable long and slender trunk with an ultrasonic sensor, and a signal from that ultrasonic sensor by FPC. In an endoscope type ultrasonic probe which tells a cable connected to the end side of said trunk, two or more slits are provided in accordance with the length direction of FPC, and it is characterized [ constitutional ] by rounding off FPC crosswise.

[0007]

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## OPERATION

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### [Function]

In the endoscope type ultrasonic probe of this device, two or more slits are provided in FPC in accordance with the length direction, and it is \*\*\*\*\*. The width of FPC is subdivided by these slits and it becomes cheap in slight roundness crosswise about FPC by them. Therefore, a trunk can be made thin. A trunk can be made smoothly crooked about all the directions also in the state where it rounded off.

FPC can be shortened and a cross talk can be reduced.

[0008]

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EXAMPLE

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[Example]

Hereafter, the example shown in a figure explains this device still in detail. Thereby, this device is not limited.

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This endoscope type ultrasonic probe 1 equips the tip side of the turnable trunk 2 with the ultrasonic sensor 3.

It has the structure of telling the signal from the ultrasonic sensor 3 to the cable with which it was connected to the end side of the trunk 2 by FPC4.

FPC4 is rounded off crosswise and the circumference is surrounded by the coil spring 7.

The coil spring 7 is connected to GND of the ultrasonic sensor 3.

[0009]

Drawing 2 is a front view taking out and showing the ultrasonic sensor 3 and FPC4. However, FPC4 is in the state which is not rounded off.

5 is a slit.

It is provided by arrangement that it divides the circuit pattern 6 two [ at a time ].

The slit 5 is deeply cut using a dicing saw. Providing by laser beam machining etc. is also possible.

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In this endoscope type ultrasonic probe 1, as shown in drawing 3, the trunk 2 becomes thin and it can be smoothly crooked now in all the directions.

FPC4 can be shortened and a cross talk decreases.

[0011]

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**CLAIMS**

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[The scope of a claim for utility model registration]

[Claim 1]Equip the tip side of a turnable long and slender trunk with an ultrasonic sensor, and a signal from the ultrasonic sensor by FPC. An endoscope type ultrasonic probe having provided two or more slits in accordance with the length direction of FPC, and rounding off FPC crosswise in an endoscope type ultrasonic probe which tells a cable connected to the end side of said trunk.

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[Translation done.]

(19)日本国特許庁(JP)

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(74)代理人 弁理士 有近 紳志郎 (外1名)

(54)【考案の名称】 内視鏡型超音波プローブ

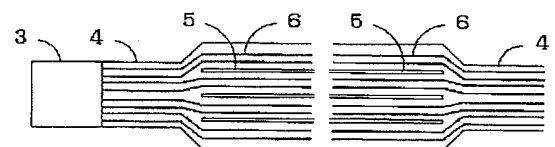
(57)【要約】

【目的】 胴を細くできると共に全ての方向について胴をスムーズに屈曲させることが出来る内視鏡型超音波プローブを提供する。

【構成】 屈曲可能な胴2の先端側に超音波センサ3を備え、FPC4によりその超音波センサ3からの信号を胴2の末端側のケーブルに伝える。FPC4は、長さ方向に沿って複数のスリット5を設け、幅方向に丸める。

【効果】 胴が細く且つ全ての方向についてスムーズに屈曲させることが出来るため、体内への挿入の操作性が向上する。

(図2)



## 【実用新案登録請求の範囲】

【請求項 1】 屈曲可能な細長い胴の先端側に超音波センサを備え、その超音波センサからの信号を F P C により、前記胴の末端側に接続されたケーブルに伝える内視鏡型超音波プローブにおいて、F P C の長さ方向に沿って複数のスリットを設けると共に、F P C を幅方向に丸めたことを特徴とする内視鏡型超音波プローブ。

## 【図面の簡単な説明】

【図 1】 この考案の内視鏡型超音波プローブの一実施例の先端部分の内部構造図である。

【図 2】 図 1 の内視鏡型超音波プローブに係る超音波センサと F P C の説明図である。

【図 3】 図 1 の内視鏡型超音波プローブの屈曲した状態を示す外観図である。

【図 4】 従来の内視鏡型超音波プローブの一例の先端部分の内部構造図である。

【図 5】 図 4 の内視鏡型超音波プローブに係る超音波センサと F P C の説明図である。

## 【符号の説明】

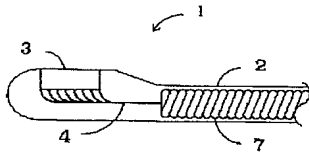
- 1 内視鏡型超音波プローブ
- 2 胴
- 3 超音波センサ
- 4 F P C
- 5 スリット
- 7 スプリング

【図 1】

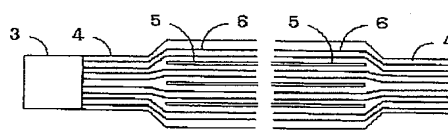
【図 2】

【図 3】

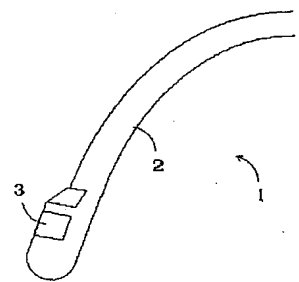
(図 1)



(図 2)



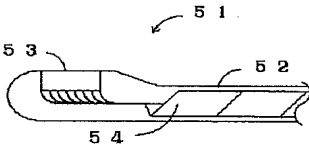
(図 3)



【図 4】

【図 5】

(図 4)



(図 5)



**【考案の詳細な説明】****【0001】****【産業上の利用分野】**

この考案は、内視鏡型超音波プローブに関し、さらに詳しくは、胴を細くすることを可能にすると共に屈曲性を高めた内視鏡型超音波プローブに関する。

**【0002】****【従来の技術】**

図4は、従来の内視鏡型超音波プローブの一例の先端部分の内部構造図である。

この内視鏡型超音波プローブ51は、屈曲可能な細長い胴52の先端側に超音波センサ53を備えており、その超音波センサ53からの信号を、FPC (Flexible Print Circuit) 54により、胴52の末端側に接続されたケーブルに伝える構造になっている。

FPC54をスパイラル状に巻いているのは、屈曲性を高めて、胴52がどの方向にも屈曲できるようにするためである。

**【0003】**

図5は、超音波センサ53とFPC54を取り出して示した正面図である。

56は、配線パターンである。

**【0004】****【考案が解決しようとする課題】**

上記従来の内視鏡型超音波プローブ51では、FPC54をスパイラル状に巻いているため、中空部分が形成され、胴52をあまり細くできない問題点がある。また、十分な屈曲が得られない問題点がある。

さらに、FPC54が長くなり、クロストークが増える問題点がある。

**【0005】**

そこで、この考案の目的は、簡単な構成で、全ての方向について胴をスムーズに屈曲させることが出来ると共に胴を細くできるようにし、また、FPCを短くできるようにした内視鏡型超音波プローブを提供することにある。

**【0006】**

**【課題を解決するための手段】**

この考案の内視鏡型超音波プローブは、屈曲可能な細長い胴の先端側に超音波センサを備え、その超音波センサからの信号をFPCにより、前記胴の末端側に接続されたケーブルに伝える内視鏡型超音波プローブにおいて、FPCの長さ方向に沿って複数のスリットを設けると共に、FPCを幅方向に丸めたことを構成上の特徴とするものである。

**【0007】****【作用】**

この考案の内視鏡型超音波プローブでは、FPCに長さ方向に沿って複数のスリットを設けられている。これらスリットによってFPCの幅が細分され、FPCを幅方向に丸めやすくなる。従って、胴を細くできる。また、丸めた状態でも全ての方向について胴をスムーズに屈曲させることが出来る。

また、FPCを短くでき、クロストークを減らすことが出来る。

**【0008】****【実施例】**

以下、図に示す実施例によりこの考案をさらに詳細に説明する。なお、これによりこの考案が限定されるものではない。

図1は、この考案の内視鏡型超音波プローブの一実施例の先端部分の内部構造図である。

この内視鏡型超音波プローブ1は、屈曲可能な胴2の先端側に超音波センサ3を備えており、その超音波センサ3からの信号を、FPC4により、胴2の末端側に接続されたケーブルに伝える構造になっている。

FPC4は、幅方向に丸められ、その周囲をコイルスプリング7で囲まれている。

コイルスプリング7は、超音波センサ3のGNDに接続されている。

**【0009】**

図2は、超音波センサ3とFPC4を取り出して示した正面図である。但し、FPC4は丸めていない状態である。

5は、スリットであり、配線パターン6が2本ずつ分れるような配置で設けら

れている。

スリット5は、ダイシングソーを用いて切り込まれる。レーザ加工などにより設けることも可能である。

#### 【0010】

この内視鏡型超音波プローブ1では、図3に示すように、胴2が細くなり、全ての方向にスムーズに屈曲できるようになる。

また、FPC4を短くでき、クロストークが少なくなる。

#### 【0011】

##### 【考案の効果】

この考案の内視鏡型超音波プローブによれば、簡単な構成で、胴を細くできると共に全ての方向について胴をスムーズに屈曲させることが出来る。

このため、体内への挿入の操作性が向上する。

また、クロストークが少ないため、画質が向上する。